

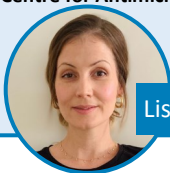
Developing multi-disciplinary and context specific solutions to tackle antimicrobial resistance

Erica Westwood¹, Lisa Haagensen², Mirfin Mpundu³

¹Implementation Research Advisor; ²Project Manager; ³Partnerships and Stakeholder Engagement Lead Africa
International Centre for Antimicrobial Resistance Solutions (ICARS)



Erica Westwood



Lisa Haagensen



Mirfin Mpundu

In the winter of 2020, the International Centre for Antimicrobial Resistance Solutions (ICARS) published an article in the 38th volume of the APUA Newsletter¹. It introduced ICARS as a recently launched partnership that would co-develop “pilot intervention and implementation research projects” with ministries and stakeholders in low- and middle-income countries (LMICs). The ambition was to develop cost-effective and context specific solutions for antimicrobial resistance (AMR) that are owned, led and eventually scaled by LMIC ministries. Since then, ICARS has evolved into an independent self-governed organisation with a Board of Directors; a Technical Advisory Forum; and 23 employees and consultants with relevant expertise to deliver on ICARS’ vision and mission. Importantly, ICARS has now approved and launched several projects, and is in the process of initiating additional projects and partnerships to mitigate AMR (Figure 1). This article provides an update on ICARS’ portfolio and approach for multi-stakeholder partnerships to tackle specific AMR challenges.

Why ICARS?

While evidence exists on how to best tackle AMR, there is still a critical gap in translating such evidence into action. Many countries have developed AMR National Action Plans (NAPs), but in resource poor settings the challenge remains for how best to implement initiatives to reduce AMR; for example due to competing priorities, limited funding and often a need for more technical and/or infrastructure capacity, amongst other factors.

ICARS uses top-down and bottom-up approaches to co-develop context-specific solutions for tackling AMR across the One Health spectrum. This ensures that expertise from both ministries, central policy agencies and local researchers are included to support a holistic approach to tackling AMR.

ICARS Demonstration Projects

ICARS’ project portfolio currently focuses on small-scale demonstration research projects that aim to develop and test interventions to mitigate AMR. These are usually 2-3 years in duration, with a budget of \$500-750k per project. Projects adopt intervention and implementation research approaches, to develop and test solutions within a specific setting. Successful projects are intentionally designed to meet local needs and complexities, and therefore benefit from multidisciplinary approaches to fully understand the different

drivers and influencing factors that impact AMR emergence and transmission in a setting.

Implementation research is “*the scientific inquiry into questions concerning implementation — the act of carrying an intention into effect*”^{2,3}. This means there should be adaptation to the study setting and investigation of how the intervention works within the wider social, political, economic and health context.

This philosophy is at the heart of the ICARS model and project portfolio. Dialogues with various ministries in LMICs have shown a clear desire from governments to collaborate on a range of topics including human health antimicrobial stewardship (AMS) challenges. Based on best-practice guidance, stewardship in healthcare settings could benefit from a multidisciplinary approach within the healthcare team⁴. For stewardship interventions to be sustainable and scalable, however, a wider perspective is required – including but not limited to - social sciences. For example, projects

across the ICARS portfolio include economic expertise to assess intervention cost effectiveness, as well as behaviour change expertise to support sustainability in prescribing and use practices.

It is clear from the literature that antimicrobial use, particularly in LMICs, is highly influenced by self-medication and non-prescribed usage

through informal channels and is also driven by complex systems within the health care setting and outside of it^{5,6}. Understanding drivers and developing relevant interventions require project development and delivery by local stakeholders and researchers, with appropriate support and resources to bring forward the implementation research perspective for more effective interventions. ICARS intends to move the dial by supporting nationally developed, multi-disciplinary and complementary approaches designed to recognise and tackle real-world challenges.

Case Study: ICARS Partnerships in Zambia

ICARS is collaborating with the Government and a range of stakeholders in Zambia through different avenues to address antimicrobial prescribing and use practices. Like other countries, overuse and misuse of antimicrobials is a driver of AMR in Zambia⁷. In the human sector, selling or dispensing antimicrobials does not always adhere to best-practice⁸. In the community, antibiotics are also accessed from informal

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providers and use practices can be inconsistent. Therefore, this requires interventions and solutions that are developed within the health system and the community.

To tackle this challenge, ICARS is collaborating with the Zambia National Public Health Institute (ZNPHI) and Lusaka University Teaching Hospital to co-develop a project that aims to address inappropriate antibiotic use in blood stream infections (BSIs) and urinary tract infections (UTI) along the continuum of care from primary to tertiary healthcare facilities. This project has a multipronged approach to implement a stewardship intervention that will adapt the core components of the WHO's Practical Toolkit on *Antimicrobial Stewardship Programmes In Low- and Middle Income Countries*, as well as CDC recommendations^{4,9}. It also builds on ReAct Africa's work on piloting AMS in some health facilities. Focusing on BSIs and UTIs will, by proxy, strengthen stewardship efforts and committees in the hospitals critical to AMS. The aim is to adapt this best-practice approach from the toolkit to local context, e.g. through existing laboratory infrastructure or accessible resources such as reagents and antibiotics. Another critical aspect of this project is to assess the economic impact of the adapted AMS programme and understand activity affordability beyond the pilot area. In this context, inappropriate antimicrobial use for BSIs will need to be addressed through health care settings antibiotic susceptibility results, resistance profiles and evidence-based guidelines. The University Teaching Hospital recently launched its Standard Treatment Guidelines based on local susceptibility patterns supported by ReAct Africa and the University of Maryland. The same approach will be used for addressing UTIs.

To compliment the project led by the Zambian Ministry, and to strengthen solutions that are developed and owned by the community, the Wellcome Trust in partnership with ICARS, is supporting Eden University to test and implement a Responsive Dialogue toolkit to tackle AMR in three community settings in Zambia¹⁰. The intention of this approach is to adopt a participatory methodology with a wide range of community stakeholders, including e.g. policy makers, research institutions, civil society, women's groups, non-governmental organisations, the general public and community pharmacies. Through community conversations, the project will gather evidence on antibiotic-seeking behaviour, identify drivers of antibiotic use in relation to UTIs, and develop community-informed and contextually relevant solutions that not only address AMR and antibiotic use, but also inform how the Zambian AMR NAP and associated

policies are implemented. This participatory approach recognises the complex role antibiotics play in societies and uses dialogue, learning and solutions to address the gap between local realities and policies.

Partnerships for Sustainable Solutions

Together, these partnerships in Zambia show how one AMR challenge may need to be addressed from different angles, with a wide set of stakeholders who can help elucidate the complexities of antimicrobial use patterns, as well as solutions that are feasible and have potential to scale up. Through developing relationships with national stakeholders to co-develop projects that address country-identified priorities and using complementary methodologies, the ambition is to support a deeper set of interventions that can support sustainable AMR mitigation.

This is a mission that cannot be achieved alone, and partnerships are at the heart of ICARS' model¹¹. Each partner has unique capacities and expertise that brings us closer to our goal of tackling drug-resistant infections across the One Health spectrum.

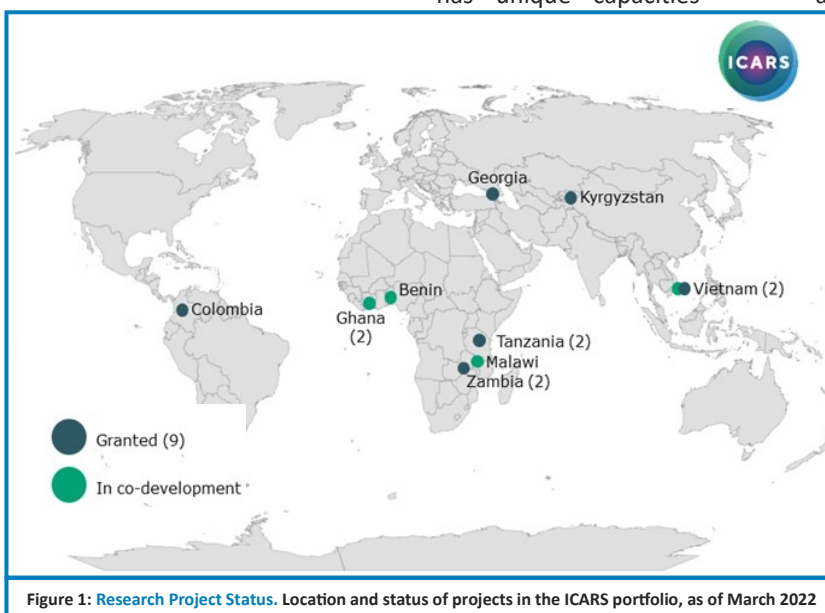


Figure 1: Research Project Status. Location and status of projects in the ICARS portfolio, as of March 2022

References

1. ISAC/APUA. ISAC / APUA Newsletter. Volume 38, No.1: Winter 2020
2. Peters DH *et al.* Implementation research: what it is and how to do it. *BMJ*. 2013;20;347:f6753
3. Theobald S *et al.* Implementation research: new imperatives and opportunities in global health. *Lancet*. 2018;17;392:2214-2228

4. World Health Organization. (2019) Antimicrobial stewardship programmes in health-care facilities in low- and middle-income countries: a WHO practical toolkit. World Health Organization. License: CC BY-NC-SA 3.0 IGO
5. Lam TT *et al.* What are the most effective community-based antimicrobial stewardship interventions in low- and middle-income countries? A narrative review. *J Antimicrob Chemother*. 2021;76:1117-1129
6. Tompson AC *et al.* (2021) *Addressing antibiotic use: insights from social science around the world*. Project Report. London School of Hygiene & Tropical Medicine
7. Government of the Republic of Zambia. (N.D). 2017–2027 Multisectoral National Action Plan on Antimicrobial Resistance, Zambia.
8. Kalungia AC *et al.* Non-prescription sale and dispensing of antibiotics in community pharmacies in Zambia. *Expert Rev Anti Infect Ther*. 2016;14:1215-23
9. CDC. Core Elements of Hospital Antibiotic Stewardship Programs. Atlanta, GA: US Department of Health and Human Services, CDC; 2019
10. Wellcome Trust. (N.D). Responsive Dialogues: Delivering Policies and Actions on AMR
11. For more information see: <https://icars-global.org/partner/>